



Authorizations and Permits for Protected Species (APPS)

File #: 1345-7R

Title: Renew: Warmwater Fish Species Monitoring

Applicant Information

Title: ESA Response Biologist
Affiliation: Washington Department of Fish and Wildlife, ESA Unit-Fish Program
Address: 600 Capitol Way N
City,State,Zip: Olympia, WA 98501
Phone Number: (360)902-2700
Email: FISHPGM@dfw.wa.gov

Project Information

File Number: 1345-7R

Application Status: **Application Complete**

Project Title: Renew: Warmwater Fish Species Monitoring

Project Status: Renewal

Previous Federal or State Permit: [1345 - 6A](#)

Permit Requested:

- ESA Section 10(a)(1)(A) permit (Pacific fish)

Where will activities occur? Washington (including Columbia River and offshore waters)

State department of fish and game/wildlife: Project will be carried out by WDFW

Research Timeframe: **Start:** 04/16/2012 **End:** 12/31/2016

Methods:	<p>Warmwater fish surveys are conducted primarily in May, June, August, September, and October, using standardized sampling methods as outlined in Bonar et al. 2000 (attached). These surveys use three gear types: boat electrofishing, gill nets, and fyke nets.</p> <p>Standard boat electrofishing gear consists of Smith-Root SR-16 or SR-18 electrofishing boats with 5.0 GPP pulsator units. The gear is fished using pulsed DC (120 Hz, 250-350v) current at 3-4 amps power. The cathodes electrodes are six-dropper stainless steel wire "spider" array on each boom While electrofishing, the boat is maneuvered through shallow water (less than 6 feet deep) with the pedal down continuously for a total of 600 seconds per section. Fish are netted and placed into an aerated live well.</p> <p>Gill and fyke net locations are randomly chosen. The nets are set at dusk and retrieved the next morning. Fish from the different nets and set sites are processed separately but all are immediately placed into an aerated live well before measuring and weighing. Gill nets are 150' long x 8' deep, variable mesh monofilament with the following mesh size and panel length: 0.5" square - 25', 0.75" square – 25', 1" square – 50', 2" square – 50'. The fyke nets are 4' diameter hoops with two 25' wings and up to a 100' lead barrier. The mesh size is 0.25".</p> <p>Fish are weighed, measured for length, and scales are taken from a subsample of warmwater game fish. Fish are allowed to recover and are returned alive to the area from which they were netted. Fish that do not recover are returned to the water for nutrient enhancement. Special attention is paid to ESA listed species, and they are returned to water as quickly as possible, or as soon as they recover, minimizing handling to reduce stress.</p>
Lethal Take:	Not Applicable
Anticipated Effects on Animals:	In McMichael et al. 1998, injury rate for captured salmonids less than 250 mm in length was 1.2% for O. mykiss. Longer than 250 mm it was 27.7%. Injuries were detected by X-rays and necropsies so these rates are therefore considered an absolute percent of injury (both severe and slight) and not merely a percent of more serious, externally visible injuries. McMichael et al. (1998) used different pulsator settings than those used by WDFW. They used a pulsator frequency setting of 30 Hz, a voltage of 450, and amperage of 7, while this study uses a frequency setting of 120 Hz, a voltage of 250-350 and amperage of 3-4. The lower voltage and amperage markedly reduces injuries to fish. J. Johnson estimated salmonid capture injury rates for fish longer than 250 mm to be about 60% at boat electrofishing settings similar to those used during this study's warmwater surveys (Smith-Root, Inc., pers. comm.). Johnson's studies measured higher peak power densities than those measured on WDFW boats at Silver Lake in 1999.
Measures to Minimize Effects to Listed Species:	<p>Surveys are timed to minimize takes of salmonids and electrofishing will not occur in a section of water if adult salmonids are observed. Surveys of warmwater fish in rivers are usually conducted in the backwater sloughs, oxbow lakes, and ponds, rather than in the main channel. Survey timing, warmer water temperatures, and limiting sampling to shallow shoreline sections minimizes the number of resident and anadromous salmonids taken with boat electrofishing gear. Over the history of this program, these measures have proven to be very effective in avoiding interactions with listed salmonids, as evidenced by the low take numbers reported each year.</p> <p>All boat electrofishing drivers have been certified through courses by either Smith Root, Inc. or the United States Fish and Wildlife electrofishing course. We will follow the guidance and training regimen described in the NMFS 2000 Electrofishing Guidelines (http://www.nwr.noaa.gov/ESA-Salmon-Regulations-Permits/4d-Rules/upload/electro2000.pdf)</p>
Resources Needed to Accomplish Objectives:	The warmwater program consists of four regional teams with two biologists each, and two headquarters staff. Field equipment consists of four Smith-Root electrofishing boats, six full size pickup trucks, a minimum of 16 fyke nets, several dozen experimental gill nets, and sufficiient sundry gear to conduct field surveys. The program is funded by a pre-determined percentage of WDFW fishing license sales, as established by legislation.
Disposition of Tissues:	Not Applicable
Public Availability of Product/Publications:	Warmwater survey reports are availalble at the WDFW website, http://wdfw.wa.gov

Federal Information

Federal Agency	Type	Authorization Number and Title	Date Signed	Expiration Date	Listing Units/Stocks Covered	Comments
U.S. Fish and Wildlife Service (FWS)	Section 7 Consultation (Biological Opinion)	(6007.2100) Revised Section 7 Programmatic Consult	02/14/2000		N/A	

Location/Take Information

Location
Research Area: Pacific Ocean **State:** WA **Stream Name:** All major lakes, rivers, and tributaries throughout Washington state
Location Description: Major lakes, rivers, and tributaries throughout the state of Washington.

Take Information

Line	Ver	Species	Listing Unit/Stock	Production /Origin	Life Stage	Sex	Expected Take	Indirect Mort	Take Action	Observe /Collect Method	Procedure	Run	Transport Record	Begin Date	End Date
1		Salmon, Chinook	Lower Columbia River (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Net, Gill		Mixed	N/A	4/16/2012	12/31/2016
2		Salmon, Chinook	Lower Columbia River (NMFS Threatened)	Listed Hatchery Adipose Clip	Juvenile	Male and Female	25	1	Capture/Handle/Release Fish	Net, Gill		Mixed	N/A	4/16/2012	12/31/2016
3		Salmon, Chinook	Lower Columbia River (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Net, Fyke		Mixed	N/A	4/16/2012	12/31/2016
4		Salmon, Chinook	Lower Columbia River (NMFS Threatened)	Listed Hatchery Adipose Clip	Juvenile	Male and Female	25	1	Capture/Handle/Release Fish	Net, Fyke		Mixed	N/A	4/16/2012	12/31/2016
5		Salmon, Chinook	Lower Columbia River (NMFS Threatened)	Natural	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Net, Gill		Mixed	N/A	4/16/2012	12/31/2016
6		Salmon, Chinook	Lower Columbia River (NMFS Threatened)	Natural	Juvenile	Male and Female	25	1	Capture/Handle/Release Fish	Net, Gill		Mixed	N/A	4/16/2012	12/31/2016
7		Salmon, Chinook	Lower Columbia River (NMFS Threatened)	Natural	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Net, Fyke		Mixed	N/A	4/16/2012	12/31/2016
8		Salmon, Chinook	Lower Columbia River (NMFS Threatened)	Natural	Juvenile	Male and Female	25	1	Capture/Handle/Release Fish	Net, Fyke		Mixed	N/A	4/16/2012	12/31/2016
9		Salmon, Chinook	Lower Columbia River (NMFS Threatened)	Natural	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Electrofishing, Boat		Mixed	N/A	4/16/2012	12/31/2016
10		Salmon, Chinook	Lower Columbia River (NMFS Threatened)	Natural	Juvenile	Male and Female	25	2	Capture/Handle/Release Fish	Electrofishing, Boat		Mixed	N/A	4/16/2012	12/31/2016
11		Salmon, Chinook	Lower Columbia River (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Electrofishing, Boat		Mixed	N/A	4/16/2012	12/31/2016
12		Salmon, Chinook	Lower Columbia River (NMFS Threatened)	Listed Hatchery Adipose Clip	Juvenile	Male and Female	25	2	Capture/Handle/Release Fish	Electrofishing, Boat		Mixed	N/A	4/16/2012	12/31/2016
13		Salmon, Chinook	Puget Sound (NMFS Threatened)	Natural	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Electrofishing, Boat		Mixed	N/A	4/16/2012	12/31/2016
14		Salmon, Chinook	Puget Sound (NMFS Threatened)	Natural	Juvenile	Male and Female	25	2	Capture/Handle/Release Fish	Electrofishing, Boat		Mixed	N/A	4/16/2012	12/31/2016
15		Salmon, Chinook	Puget Sound (NMFS Threatened)	Natural	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Net, Fyke		Mixed	N/A	4/16/2012	12/31/2016
16		Salmon, Chinook	Puget Sound (NMFS Threatened)	Natural	Juvenile	Male and Female	25	1	Capture/Handle/Release Fish	Net, Fyke		Mixed	N/A	4/16/2012	12/31/2016
17		Salmon, Chinook	Puget Sound (NMFS Threatened)	Natural	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Net, Gill		Mixed	N/A	4/16/2012	12/31/2016
18		Salmon, Chinook	Puget Sound (NMFS Threatened)	Natural	Juvenile	Male and Female	25	1	Capture/Handle/Release Fish	Net, Gill		Mixed	N/A	4/16/2012	12/31/2016

19	Salmon, Chinook	Puget Sound (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Net, Fyke	Mixed	N/A	4/16/2012	12/31/2016
20	Salmon, Chinook	Puget Sound (NMFS Threatened)	Listed Hatchery Adipose Clip	Juvenile	Male and Female	25	1	Capture/Handle/Release Fish	Net, Fyke	Mixed	N/A	4/16/2012	12/31/2016
21	Salmon, Chinook	Puget Sound (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Net, Gill	Mixed	N/A	4/16/2012	12/31/2016
22	Salmon, Chinook	Puget Sound (NMFS Threatened)	Listed Hatchery Adipose Clip	Juvenile	Male and Female	25	1	Capture/Handle/Release Fish	Net, Gill	Mixed	N/A	4/16/2012	12/31/2016
23	Salmon, Chinook	Puget Sound (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Electrofishing, Boat	Mixed	N/A	4/16/2012	12/31/2016
24	Salmon, Chinook	Puget Sound (NMFS Threatened)	Listed Hatchery Adipose Clip	Juvenile	Male and Female	25	2	Capture/Handle/Release Fish	Electrofishing, Boat	Mixed	N/A	4/16/2012	12/31/2016
25	Salmon, coho	Lower Columbia River (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Net, Gill	Mixed	N/A	4/16/2012	12/31/2016
26	Salmon, coho	Lower Columbia River (NMFS Threatened)	Listed Hatchery Adipose Clip	Juvenile	Male and Female	25	1	Capture/Handle/Release Fish	Net, Gill	Mixed	N/A	4/16/2012	12/31/2016
27	Salmon, coho	Lower Columbia River (NMFS Threatened)	Natural	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Net, Gill	Mixed	N/A	4/16/2012	12/31/2016
28	Salmon, coho	Lower Columbia River (NMFS Threatened)	Natural	Juvenile	Male and Female	25	1	Capture/Handle/Release Fish	Net, Gill	Mixed	N/A	4/16/2012	12/31/2016
29	Salmon, coho	Lower Columbia River (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Net, Fyke	Mixed	N/A	4/16/2012	12/31/2016
30	Salmon, coho	Lower Columbia River (NMFS Threatened)	Listed Hatchery Adipose Clip	Juvenile	Male and Female	25	1	Capture/Handle/Release Fish	Net, Fyke	Mixed	N/A	4/16/2012	12/31/2016
31	Salmon, coho	Lower Columbia River (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Electrofishing, Boat	Mixed	N/A	4/16/2012	12/31/2016
32	Salmon, coho	Lower Columbia River (NMFS Threatened)	Listed Hatchery Adipose Clip	Juvenile	Male and Female	25	2	Capture/Handle/Release Fish	Electrofishing, Boat	Mixed	N/A	4/16/2012	12/31/2016
33	Salmon, coho	Lower Columbia River (NMFS Threatened)	Natural	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Net, Fyke	Mixed	N/A	4/16/2012	12/31/2016
34	Salmon, coho	Lower Columbia River (NMFS Threatened)	Natural	Juvenile	Male and Female	25	1	Capture/Handle/Release Fish	Net, Fyke	Mixed	N/A	4/16/2012	12/31/2016
35	Salmon, coho	Lower Columbia River (NMFS Threatened)	Natural	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Electrofishing, Boat	N/A	N/A	4/16/2012	12/31/2016
36	Salmon, coho	Lower Columbia River (NMFS Threatened)	Natural	Juvenile	Male and Female	25	2	Capture/Handle/Release Fish	Electrofishing, Boat	N/A	N/A	4/16/2012	12/31/2016
37	Steelhead	Lower Columbia River (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Electrofishing, Boat	Mixed	N/A	4/16/2012	12/31/2016
38	Steelhead	Lower Columbia River (NMFS Threatened)	Listed Hatchery Adipose Clip	Juvenile	Male and Female	25	2	Capture/Handle/Release Fish	Electrofishing, Boat	Mixed	N/A	4/16/2012	12/31/2016

39	Steelhead	Lower Columbia River (NMFS Threatened)	Natural	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Electrofishing, Boat	Mixed	N/A	4/16/2012	12/31/2016
40	Steelhead	Lower Columbia River (NMFS Threatened)	Natural	Juvenile	Male and Female	25	2	Capture/Handle/Release Fish	Electrofishing, Boat	Mixed	N/A	4/16/2012	12/31/2016
41	Steelhead	Lower Columbia River (NMFS Threatened)	Natural	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Net, Fyke	Mixed	N/A	4/16/2012	12/31/2016
42	Steelhead	Lower Columbia River (NMFS Threatened)	Natural	Juvenile	Male and Female	25	1	Capture/Handle/Release Fish	Net, Fyke	Mixed	N/A	4/16/2012	12/31/2016
43	Steelhead	Lower Columbia River (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Net, Fyke	Mixed	N/A	4/16/2012	12/31/2016
44	Steelhead	Lower Columbia River (NMFS Threatened)	Listed Hatchery Adipose Clip	Juvenile	Male and Female	25	1	Capture/Handle/Release Fish	Net, Fyke	Mixed	N/A	4/16/2012	12/31/2016
45	Steelhead	Lower Columbia River (NMFS Threatened)	Natural	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Net, Gill	Mixed	N/A	4/16/2012	12/31/2016
46	Steelhead	Lower Columbia River (NMFS Threatened)	Natural	Juvenile	Male and Female	25	1	Capture/Handle/Release Fish	Net, Gill	Mixed	N/A	4/16/2012	12/31/2016
47	Steelhead	Lower Columbia River (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Net, Gill	Mixed	N/A	4/16/2012	12/31/2016
48	Steelhead	Lower Columbia River (NMFS Threatened)	Listed Hatchery Adipose Clip	Juvenile	Male and Female	25	1	Capture/Handle/Release Fish	Net, Gill	Mixed	N/A	4/16/2012	12/31/2016
49	Steelhead	Puget Sound (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Net, Gill	Mixed	N/A	4/16/2012	12/31/2016
50	Steelhead	Puget Sound (NMFS Threatened)	Listed Hatchery Adipose Clip	Juvenile	Male and Female	25	1	Capture/Handle/Release Fish	Net, Gill	Mixed	N/A	4/16/2012	12/31/2016
51	Steelhead	Puget Sound (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Net, Fyke	Mixed	N/A	4/16/2012	12/31/2016
52	Steelhead	Puget Sound (NMFS Threatened)	Listed Hatchery Adipose Clip	Juvenile	Male and Female	25	1	Capture/Handle/Release Fish	Net, Fyke	Mixed	N/A	4/16/2012	12/31/2016
53	Steelhead	Puget Sound (NMFS Threatened)	Natural	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Net, Fyke	Mixed	N/A	4/16/2012	12/31/2016
54	Steelhead	Puget Sound (NMFS Threatened)	Natural	Juvenile	Male and Female	25	1	Capture/Handle/Release Fish	Net, Fyke	Mixed	N/A	4/16/2012	12/31/2016
55	Steelhead	Puget Sound (NMFS Threatened)	Natural	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Electrofishing, Boat	Mixed	N/A	4/16/2012	12/31/2016
56	Steelhead	Puget Sound (NMFS Threatened)	Natural	Juvenile	Male and Female	25	2	Capture/Handle/Release Fish	Electrofishing, Boat	Mixed	N/A	4/16/2012	12/31/2016
57	Steelhead	Puget Sound (NMFS Threatened)	Natural	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Net, Gill	Mixed	N/A	4/16/2012	12/31/2016
58	Steelhead	Puget Sound (NMFS Threatened)	Natural	Juvenile	Male and Female	25	1	Capture/Handle/Release Fish	Net, Gill	Mixed	N/A	4/16/2012	12/31/2016

59	Steelhead	Puget Sound (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	2	0	Capture/Handle/Release Fish	Electrofishing, Boat	Mixed	N/A	4/16/2012	12/31/2016
60	Steelhead	Puget Sound (NMFS Threatened)	Listed Hatchery Adipose Clip	Juvenile	Male and Female	25	2	Capture/Handle/Release Fish	Electrofishing, Boat	Mixed	N/A	4/16/2012	12/31/2016

NEPA Checklist

- 1) If your activities will involve equipment (e.g., scientific instruments) or techniques that are new, untested,or otherwise have unknown or uncertain impacts on the biological or physical environment , please discuss the degree to which they are likely to be adopted by others for similar activities or applied more broadly.
- N/A
- 2) If your activities involve collecting, handling, or transporting potentially infectious agents or pathogens (e.g., biological specimens such as live animals or blood), or using or transporting hazardous substances (e.g., toxic chemicals), provide a description of the protocols you will use to ensure public health and human safety are not adversely affected, such as by spread of zoonotic diseases or contamination of food or water supplies.
- N/A
- 3) Describe the physical characteristics of your project location, including whether you will be working in or near unique geographic areas such as state or National Marine Sanctuaries, Marine Protected Areas, Parks or Wilderness Areas, Wildlife Refuges, Wild and Scenic Rivers, designated Critical Habitat for endangered or threatened species, Essential Fish Habitat, etc. Discuss how your activities could impact the physical environment, such as by direct alteration of substrate during use of bottom trawls, setting nets, anchoring vessels or buoys, erecting blinds or other structures, or ingress and egress of researchers, and measures you will take to minimize these impacts.
- Boats are launched at developed boat ramps, therefore ingress and egress impacts to the physical environment are minimal. Although electrofishing temporarily alters electron orientation within the water column, it does not result in permanent environmental damage. Setting and retrieving fyke and gill nets does not result in environmental damage to the physical habitat. Though these gears do not damage the physical environment in the manner we will use them, they may result in harm to individual fish.
- 4) Briefly describe important scientific, cultural, or historic resources (e.g., archeological resources, animals used for subsistence, sites listed in or eligible for listing in the National Register of Historic Places) in your project area and discuss measures you will take to ensure your work does not cause loss or destruction of such resources. If your activity will target marine mammals in Alaska or Washington, discuss measures you will take to ensure your project does not adversely affect the availability (e.g., distribution, abundance) or suitability (e.g., food safety) of these animals for subsistence uses.
- N/A
- 5) Discuss whether your project involves activities known or suspected of introducing or spreading invasive species, intentionally or not, (e.g., transporting animals or tissues, discharging ballast water, use of equipment at multiple sites). Describe measures you would take to prevent the possible introduction or spread of non-indigenous or invasive species, including plants, animals, microbes, or other biological agents.
- Electrofishing boats are inspected for aquatic vegetation upon leaving the water, and are washed between deployments into different water bodies to minimize the potential for transfer of invasive species.

Project Contacts

- Responsible Party: Charmane Ashbrook
600 Capitol Way N
Olympia, WA 98501
Phone: (360)902-2672
Email: charmane.ashbrook@dfw.wa.gov
- Primary Contact: Charmane Ashbrook
- Principal Investigator: Bruce Bolding
- Other Personnel:
- | Name | Role(s) |
|------|---------|
|------|---------|

Bill Baker	Co-Investigator
Aaron Bosworth	Co-Investigator
Jim Byrne	Co-Investigator
Steve Caromile	Co-Investigator
Adam Couto	Co-Investigator
Marc Divens	Co-Investigator
Chris Donley	Co-Investigator
Mark Downen	Co-Investigator
Daniel Garrett	Co-Investigator
Stanley Hammer	Co-Investigator
Chad Jackson	Co-Investigator
Stacie Kelsey	Co-Investigator
Randall Osborne	Co-Investigator
Marc Petersen	Co-Investigator
Michael Schmuck	Co-Investigator
Justin Spinelli	Co-Investigator
John Weinheimer	Co-Investigator

Attachments

Certification of Identity - P16346T11Signature authentication sheet 1345-7R.pdf (Added Oct 17, 2011)

Contact - Bruce Bolding: C4424T5Bolding resume.pdf (Added Apr 20, 2011)

Contact - Mark Downen: C4553T5Downen Resume 2011.rtf (Added Oct 12, 2011)

Federal Authorization - P16346T2USFWS Sec 6 bull trout (Added Oct 14, 2011)

Project Description - P16346T1Bonar et al 2000 - warmwater sampling guidelines.pdf (Added Apr 11, 2011)

Project Description - P16346T1McMichael et al 2008 - salmon injuries].pdf (Added Apr 27, 2011)

Status

Application Status:	Application Complete		
Date Submitted:	April 27, 2011		
Date Completed:	October 20, 2011		
FR Notice of Receipt Published:	November 17, 2011	Number:	2011-29762
Comment Period Closed:	December 19, 2011	Comments Received:	No Comments Addressed: No
Last Date Archived:	April 16, 2012		

• **ESA Section 10(a)(1)(A) permit (Pacific fish)**

Current Status: Issued

Status Date: April 16, 2012

Section 7 Consultation: Formal Consultation
NEPA Analysis: Categorical Exclusion
Date Cleared by General Counsel: February 28, 2012
Expire Date: December 31, 2016
Analyst Information:

- 1) Mitchell Dennis Phone: (360)753-9580
 Email: mitch.dennis@noaa.gov
- 2) Gary Rule Phone: (503)230-5424
 Email: gary.rule@noaa.gov

Modification Requests

Reports
